Sanskruti Jadhav

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Portfolio | **LinkedIn** | **GitHub**

Professional Summary:

I am Highly motivated and skilled Autonomous Driving Engineer with a strong background in Automotive Engineering and expertise in developing cutting-edge autonomous vehicle technologies. Proficient in programming languages such as C++, Python, and MATLAB, with a solid foundation in ROS (Robot Operating System), CAN and sensor integration. Demonstrated experience in implementing state-of-the-art algorithms for motion planning, sensor data analysis, and control systems.

Technical Skills:

Programming languages: C++, Python, ROS, MATLAB, Shell Scripting
Tools/Software: Irrlicht Engine, Gazebo, Unity, Isaac Sim Simulators, MATLAB and Simulink, Git, Docker, Visual Studio Code, Linux OS, Vector CANdb++, Docker, Linux PTP4l, AWS
Skills: Sensor Data Analysis (2D and 3D LiDAR, Camera, GNSS, Ultrasonic), CAN J1939 protocol, Ethernet Protocols, State machine and flow charts, ROS-CAN interfacing, Filtering Applications (Kalman, EKF, Particle), Deep Learning, and Deep Reinforcement Learning, Project Management, Preventive Quality Management

Work Experience:

Clemson University International Center for Automotive Research (CUICAR)

1. **Autonomous Driving Software Engineer | Deep Orange Link** **Jan 2022 – Current**

- Developed collaboratively million-dollar 3-ton Autonomous off-road vehicle prototype sponsored by US Army
- Implemented full stack waypoint navigation and fine- tuned the motion planning algorithm to ensure accurate and smooth vehicle navigation.
- Tested mobility control architecture through Software in Loop and Hardware in Loop on vehicle using CAN control module, brake actuators and vehicle safety controller.
- Integrated sensor drivers and validated proper functioning of LiDAR, Cameras, GNSS in the Autonomy stack and implemented precision time protocol for time synchronized data over vehicle local area network.
- Programmed ROS CAN bridge to establish communication autonomy stack to the vehicle controller.
- Deployed ROS MATLAB interface for continuous real-time monitoring of vehicle states and logging data using TCP socket client and Virtual CAN connections for post processing analysis.
- Analyzed and debugged vehicle localization problem of lateral position-drift through troubleshooting GNSS sensor data and testing on vehicle.
- Deployed State Machine for Autonomy Supervisory Control interacting with Vehicle low level controller.

2. **Graduate Research Assistant | Automation Robotics and Mechatronics Lab May 2022 – Current**

- Experienced in developing and implementing Deep Reinforcement Learning (DRL) projects with focus on bridging the simulation to reality gap in controller model development.
- Demonstrated application of control techniques in simulation environment such as Nvidia Isaac Sim, Project Chrono, and Gazebo to develop and validate on robotic platforms such as Clearpath Husky, Quansar Qcar.
- Containerized projects using Docker and Singularity platforms for efficient utilization of high-performance computing infrastructure and enhanced scalability of projects.

Achievements:

- Published (first author) research paper on Containerization Approach for High Fidelity Terramechanics Simulations at the SAE International WCX world congress experience. **Link**

Senior Engineer Project Component Manager | Bosch Chassis India **Sept 2018 – Jun 2021**

- Worked on New product development of sensors of Anti-lock Braking System (ABS) and Electronic Stability Program (ESP) for Indian Original Equipment manufacturers of Cars and two-wheelers.
- Collaborated with Cross Functional Teams to efficiently provide innovative solutions and solve complex technical challenges throughout product development cycle.
- Ensured quality standards are met following the Advanced Product Quality Planning (APQP) process.
- Led technical discussions and manage agile customer requirements and system requirements analysis.

Education:

Clemson University, Master of Science **Aug 2021 – Current**
Major: **Automotive Engineering Specialization in Vehicle Autonomy,** GPA 3.76 / 4.0 **Clemson, USA**
Relevant Courses: Autonomy Science and Systems, Deep Learning, Machine Perception for Autonomy, High Performance Computing and Simulations, Electronic Integration and Controls, System Engineering, Software Design patterns, Data Structures and Algorithms, Motion Planning

University of Pune, Bachelor of Engineering, **Aug 2013 – May 2017**
Major: **Mechanical Engineering**, GPA 3.50 / 4.0 **Pune, India**
Relevant Courses: Vehicle Dynamics, Automotive Control Systems, Automotive Electronics

Academic Projects:

- Achieved **autonomous navigation in rough terrain** as part of MathWorks MATLAB Excellence in Innovation program, by simulating waypoint navigation and implementing RRT* path planning algorithm on Turtlebot using Gazebo and Simulink.
- Implemented **Adaptive Cruise Control and emergency stopping** functionalities on an RC car by fine-tuning lane following, adaptive cruise control, and emergency stopping using a PID controller and ultrasonic sensors, and improved accuracy through the application of Kalman Filter to noisy sensor data. .
- Implemented **autonomous navigation capabilities** for Turtlebot3 burger, incorporating LIDAR and camera sensors to maneuver through dynamic obstacle environments, perform tasks such as April tag recognition, line following, stop sign detection using YOLO v3, and person following utilizing 2D Lidar sensor .
- Developed a **convolution neural network model** to accurately detect drivable areas in inclement weather conditions, achieving a mean Intersection over Union (IOU) score of 44.15% when tested on inclement weather videos using the BDD100k Dataset.
- Implemented **search-based algorithms for path planning** and modeled a function to calculate path costs using various algorithms such as Depth-first Search, Breadth-first search, A*, RRT*, and Dijkstra
- Created a Halloween-themed Witch game using **Python object-oriented programming and applied software design patterns** including Singleton, Factory, and Cloning Pattern, while adhering to clean coding practices and utilizing GIT version control.

Certifications:

- MathWorks Excellence in Innovation program Accepted solution to project 209 YouTube tutorial
- Nvidia Fundamentals of Deep Learning
- Machine Learning Specialization Coursera by Andrew Ng
- AWS Essential Training for Developers & Learning Amazon Web Services (AWS) for Developers
- Cisco Networking Fundamentals Udemy